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DOCUMENT-IDENTIFIER: US 4148304 A
TITLE: Device for measuring ovulation

Drawing Description Text (5):
FIG. 4 illustrates the voltage gradient probe applied to the forehead of the subject female;

Detailed Description Text (5):
Mounted on the cover plate 68 is the indicating meter 28 which is a conventional milliampmeter meter, an on-off switch 70 for activating the device, an indicating switch 72 which permits measurement of temperature or voltage gradient depending on the desired reading, a temperature input socket 74 for receiving the temperature input jack 50, a voltage gradient input socket 76 for receiving the voltage gradient input jack 64 and a ground socket 78 for receiving the jack 63.

Detailed Description Text (6):
Operation of the device according to the present invention is accomplished with two modes of operation for the determination of the time of ovulation. Although a single meter is used to indicate the desired reading, both the temperature measurement and the voltage gradient measurement are taken independently of the other and therefore read out separately although the two measurements could be taken simultaneously and be read out as a single indication of the state of ovulation. These two measurements, however in the embodiment shown, are normally taken one right after the other by merely switching the selecting switch 72 and holding the probes against the foregoing or against the tympanic membrane as indicated in FIGS. 2 and 4. The indicating meter 28 has a scale which is used for either temperature or voltage gradient readings. Digital readout devices could be used in place of the indicating meter. Since every woman may vary somewhat on her "base-line" reading, which is established by taking daily measurements for a period of at least thirty days to isolate the duration of ovulation, it is important to establish this "base-line" reading through daily readings taken at least once a day.

Detailed Description Text (9):
The actual measurement of the temperature and voltage levels is a two-step process according to the present invention. First, the subject should insure that the input jacks 50, 63 and 64 are securely inserted into the sockets 74, 76 and 78, as indicated in FIG. 1. The on-off switch 70 should then be moved to the "on" position. The device is now ready for use to measure either the temperature or voltage gradient of the user. The measurement should be taken one immediately after the other. When completed in this matter, the two readings serve to compliment each other and insure the greater likelihood of accurately determining the onset of ovulation.

Detailed Description Text (10):
For measurement of temperature, the indicator switch 72 is moved to the "Temp" position as indicated in FIG. 1. The finger grip portion 30 of the temperature probe 22 is grasped between the fingers and the probe is gently positioned in the ear adjacent the tympanic membrane as indicated in FIG. 2. The indicator member 28 is then read and the number indicated is recorded.

Detailed Description Text (11):
For measurement of the voltage gradient, the indicator switch 72 is positioned in the "Mils" position representing a milivolts reading for the voltage gradient. The contact disc 52 is positioned as shown in FIG. 4, against the forehead by grasping

the contact cylinder 60 between the thumb and index finger. The indicator meter 28 is read and the number indicated is recorded. After the measurements have been completed, the on-off switch 70 may be returned to the "off" position as indicated in FIG. 1. Since actual measurement requires only a few seconds, a relatively long life of the battery is anticipated if the device is activated only during the periods when measurements are being taken. Evidence that the battery is weak, may be indicated when the meter fails to reach the normal reading level. A battery condition switch may also be added to the front panel.

Detailed Description Text (12):
The circuitry for the invention as shown in FIG. 6 will now be discussed. Very high input operational amplifiers Q.sub.1 and Q.sub.2 having high input impedances in the range of 10.sup.14 ohms are connected as a differential type amplifier to provide a high common mode noise rejection. Input from the voltage gradient probe 24 is provided through IN-1 from the input jack 64 and to terminal IN-2 from the jack 63 as shown in FIGS. 1 and 6. Input from the temperature gradient probe 22 is provided by the thermistor 38 identified as R.sub.T in the schematic of FIG. 6 to be discussed hereafter. Input to amplifier Q.sub.1 is received from terminal IN-1 through input lead 100 and amplifier Q.sub.2 receives inout through input lead 102. The gain of the amplifiers Q.sub.1 and Q.sub.2 is controlled by feed back resistors R.sub.1 and R.sub.2 through output leads 104 and 106 with potentiometer R.sub.3 providing gain calibration for the amplifiers. Resistors R.sub.4 and R.sub.5 provide impedance matching and in conjunction with resistors R.sub.6 and R.sub.7 establish the Q of a tuned filter section A.sub.1. Resistor R.sub.5 receives the output of amplifier Q.sub.1 through lead 108 and provides input through lead 110 to the tuned filter section A.sub.1 . The output from amplifier Q.sub.2 flows through output lead 112 to resistor R.sub.6 and into the tuned filter section A.sub.1 through input lead 114. Resistors R.sub.8 and R.sub.9 and capacitors C.sub.1 and C.sub.2 permit tuning of the filter section A.sub.1 which tuning is accomplished by the pre-selected values of the components; in the practice of the present art of filters, it is contemplated within the scope of the art that one may be provided with continuously variable, tweakable elements capable of adjustment during use of the system. This in itself may not be invention and is not presently shown. The correct current to the indicating meter M.sub.1, shown as indicating meter 28 in FIG. 1, is established by resistor R.sub.10 when switch S.sub.2 provides contacts through terminals 1 and 2 of the switch as shown in FIG. 6 with the switch S.sub.2 being indicator switch 72 thereby permitting the selection of voltage or temperature indication.

Detailed Description Text (13):
A temperature sensitive bridge is formed by the thermistor 38 identified as R.sub.T, resistor R.sub.11, potentiometer R.sub.12, resistor R.sub.13, R.sub.14 and a battery B.sub.3 as shown in FIG. 6. Potentiometer R.sub.12 permits calibration of the temperature indication on the indicating meter M.sub.1. The bridge difference voltage across outputs 116 and 118 is amplified from amplifier Q.sub.3 which is sufficient to drive the indicating meter M.sub.1. The amplifier gain being established by resistors R.sub.15 and R.sub.16 while capacitor C.sub.3 is used to limit response to any stray alternating voltage. Current is limited to the indicating meter M.sub.1 by resistor R.sub.17 connected between the output 118 from the amplifier Q.sub.3 and terminal 3 on switch S.sub.2. Power is supplied to the units by batteries B.sub.1 and B.sub.2 when the on-off switch S.sub.1 is activated which occurs when switch 70, shown in FIG. 1, is moved. Additionally, battery B.sub.3 provides power to the temperature sensitive bridge when power switch S.sub.1 is activated.

Current US Original Classification (1):
600/549

CLAIMS:

1. A device for deriving improved data for determining the time of ovulation of a female subject, said device comprising in combination means for measuring a predetermined voltage potential and adaptable for placement between two spaced apart locations on the body of the subject, means for measuring a pedetermined temperature of the subject and adaptable for placement at a predetermined location on the body of the subject, means for indicating said voltage potential and said temperature

thereby permitting determination of the time of ovulation of the subject, said predetermined location for measuring the predetermined temperature of the subject is the tympanic membrane in an ear of the subject, said spaced apart locations on the body for measurement of said predetermined voltage potential are the forehead and fingertip of said subject, said means for measuring said predetermined voltage potential includes electrodes placed in contact with the body of the subject at said predetermined locations, said means for measuring said predetermined temperature includes a thermistor placed in contact with the body of the patient, and said indicating means includes electronic means comprising a pair of high input resistance amplifiers having inputs connected to said electrodes, a tuned filter network receiving an input from an output of said resistance amplifiers, meter means for receiving an input from the output of said filter network to visually display an output which indicates the voltage potential on said electrodes, a temperature sensitive bridge having four legs with resistors in three legs thereof and said thermistor as the forth leg thereof, and a voltage potential across two legs thereof with an output from said temperature supplied from across two alternate legs thereof, an amplifier to receive the output from said temperature sensitive bridge and supply an input to said meter means for visually displaying an output which indicates the temperature of said thermister.

2. An improved method for determining the time of ovulation in a female subject, said method comprising in combination the steps of measuring a predetermined voltage potential between two spaced apart locations on the body of the subject, measuring a predetermined temperature of the subject at a predetermined location on the body of the subject, indicating said voltage potential and said temperature thereby permitting determination of the time of ovulation of the subject, said predetermined location for measuring the predetermined temperature of the subject is the tympanic membrane in an ear of the subject, said spaced apart locations on the body for measurement of said predetermined voltage potential are the forehead and a fingertip of said subject and wherein said step for measuring said predetermined voltage potential includes placement of electrodes in contact with the body of the subject at said predetermined locations, wherein said step for measuring said predetermined temperature includes placement of a thermistor in contact with the body of the patient, and wherein said indicating step includes processing data by electronic means comprising a pair of high input resistance amplifiers having inputs connected to said electrodes, a tuned filter network receiving an input from an output of said resistance amplifiers, meter means for receiving an input from the output of said filter network to visually display an output which indicates the voltage potential on said electrodes, a temperature sensitive bridge having four legs with resistors in three legs thereof and said thermistor has the fourth leg thereof, and a voltage potential across two legs thereof with an output from said temperature supplied from across two alternate legs thereof, an amplifier to receive the output from said temperature sensitive bridge and supply an input to said meter means for visually displaying an output which indicates the temperature of said thermister.